The Chicago Naturalist

Published four times a year by
THE CHICAGO ACADEMY OF SCIENCES
for Naturalists of the Chicago Area

VOLUME 4 MARCH, 1941 NUMBER 1

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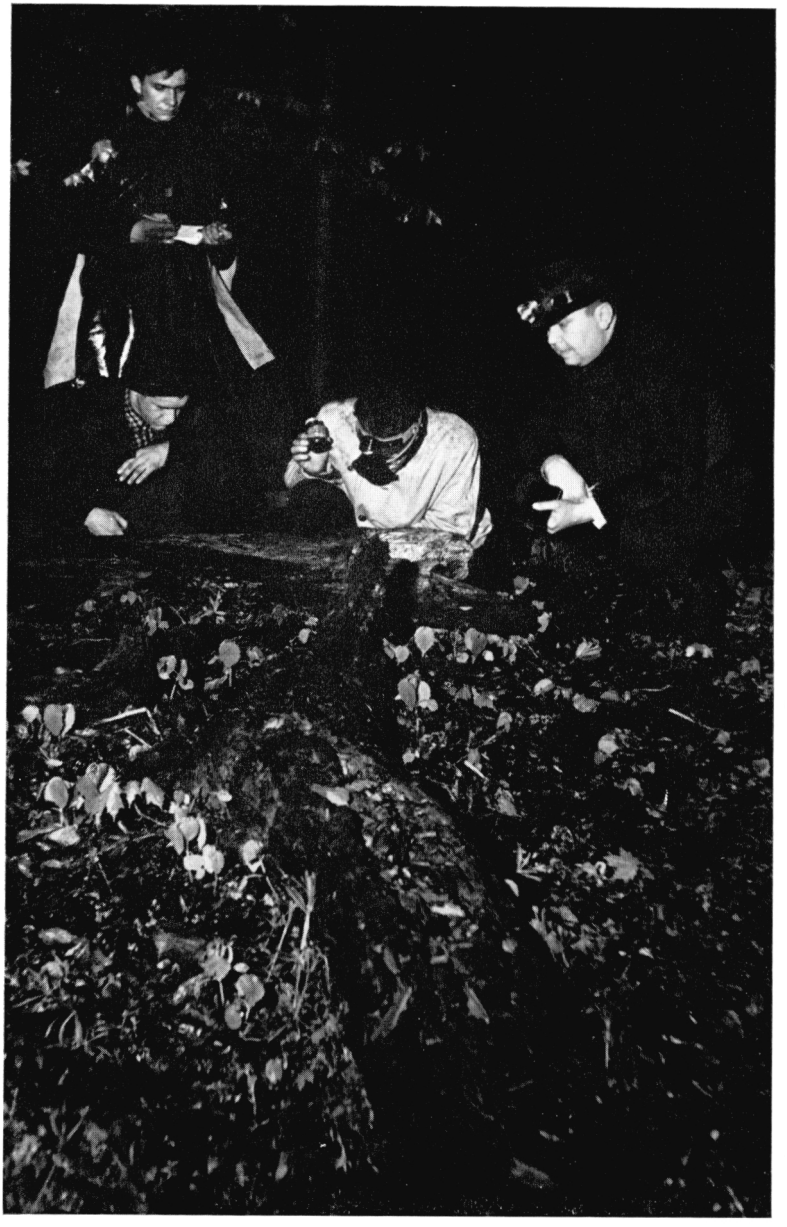


How the Other Half Lives

ELIOT C. WILLIAMS, JR.*

Classical studies of natural history were primarily concerned with animals that are active during the day. In the past ten years, however, there has been a steadily increasing interest in animals which are active at night and spend the daylight hours in secluded resting places. The results of these studies have shown that over half of the animals are more or less confined to the night for their period of activity and they may, therefore, be called nocturnal, as opposed to diurnal or day-active animals.

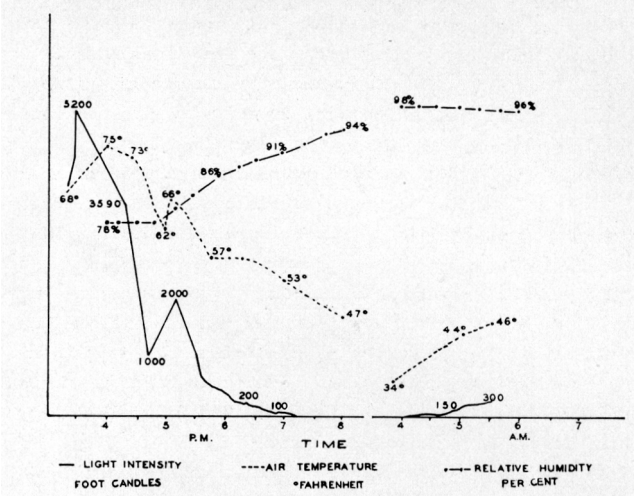
One of the outstanding results of this "division of labor" is the use of a given habitat by a larger number of animals than could exist there if only the day or the night were available. While the daylight crew is in control the night shift is resting and with the coming of night there is a change in relative position, one group retiring to a safe resting place and the other coming out to "work" the territory. There are, of course, notable exceptions in which particular animals are active regardless of the time of the day or night but, by and large, the tendency is for one kind of animal to be either nocturnal or diurnal in its activity. Within these two groups there are some forms which confine their active periods to dawn, dusk, or both; the former being termed auroral and the latter crepuscular.

The environmental differences between day and night are rather striking. The most obvious one is in light intensity. There are other important distinctions, however, most of which are either directly or indirectly associated with the absence of the sun during approximately half of the twenty-four hours which constitute our day. The air temperature falls perceptibly at night and the relative humidity (the basis of measuring the amount of moisture in the air) rises. The rate of evaporation, closely associated with these two factors, is lower at night. Dawn and dusk are the periods when environmental factors slowly change from one condition to the other. Accurate measurements can be made by means of special instruments. The graph shows the changes which occur at dawn and dusk.

Most of the information about the animals active at night comes from reports which state that this animal or that is usually seen abroad only at night. These reports form a very valuable foundation for more specialized studies. On the basis of such data, Park (1940), using material given by Gregory (1936), has shown that for 49 subspecies of mammals found in the Chicago Area 39 per cent are diurnal and 61 per cent nocturnal.

*Assistant to the Director, Chicago Academy of Sciences.

Some animals, such as bats, owls, and most of the cat family, are well known as lovers of darkness. One would indeed be surprised to see a bat flying in full daylight. Other more or less typical nocturnal animals are earthworms, terrestrial snails, millipeds, most spiders, many insects, frogs, toads, and some reptiles. There are also a great many representatives of other large categories which are typically nocturnal. Examination of the foregoing list will immediately bring to mind cases with which the reader is familiar. For example, when one is going fishing he takes his flashlight and hunts for "night crawlers," large earthworms which we like to think are particularly appetizing to the fish. If it is necessary to get worms in the daytime, one must go to the trouble of digging them out of the ground.



Graph of changes in light intensity, air temperature, and relative humidity at dawn and dusk.

Many nocturnal animals are particularly well adapted for night life; or, to put it another way, they are so constituted that it is not possible for them to meet adequately the conditions which prevail during the day. The senses of smell and touch are often highly developed in such forms. These two senses aid the animals in the location of food and others of their kind, and also warn them of dangerous enemies.

A number of arthropods possess the power of light production, including the well known fireflies and some click beetles (Byrnes, 1939). The value of this characteristic has been disputed and it is not possible to give a definite answer on the question. Some claim it to be a means of attracting the opposite sex, others that it is a rhythmic response to environmental stimuli, and a third suggestion is that it acts

as a protection against possible predators. Any one, or all, of these hypotheses may prove to be correct.

"Cold light" is one of the most interesting phenomena found in nature. Oxygen and water react together in the presence of a complex set of enzymes to produce the most efficient light known to man. All of our sources of artificial light entail a great deal of heat energy which is lost. In the animal light, approximately 96 per cent of the energy goes into light. There is a regular rhythm in the production of light in some animals. They produce light only at night under normal conditions and can be stimulated to do so during the day only with difficulty.

The sense of sight is of course rather limited in its use at night. However, some nocturnal animals are able to see rather well. Various reflecting structures are present in the compound eyes of invertebrates which enable the animal to make use of very small amounts of light. In the vertebrate eye a number of means have developed, including reflecting surfaces and loss of pigmentation, for the utilization of the low illumination characteristic of the darkened hours of the day (Walls, 1938). The eyeball of the owl is shaped like an hour glass with the retina at the back about the same size as the pupil. This shape results in a concentration of all the available light on the retina.

The balance resulting from the division of periods of activity between the day and night is of considerable importance. As mentioned above, it enables two entire groups of animals to exist where there could be Only one if all animals rested and fed at the sane time. There is only a certain amount of available space for feeding, shelter, and reproduction, and the competition between members of a community is keen.

On a recent expedition to Peru, Karl P. Schmidt and Colin C. Sanborn of the Field Museum found two rodents which illustrate this division very nicely. A trap line was set out and, among other things, two species of rodents were collected. Although these animals live in the same region and their food habits are presumably similar, one species *(Eumeomys boliviensis flavidor)* was found in the traps only in the late afternoon and the other *(Phyllotis arenarius)* was always taken in the morning. As the traps were visited twice daily, it is obvious that the former was active during the day and the latter during the night.

Competition may well be the life of trade in our social order, but in nature it is more than that—it is a struggle for existence. Darwin popularized this never-ending process in his theory of the survival of the fittest. Although this theory will not answer all of the puzzling questions of evolution, it is an expression of a great moving force in the natural world. As a result of competition animals are forced into

a certain type of environment for one or another of the following reasons: their food is located there ; the conditions are in keeping with their physiological requirements ; a stronger animal is in control in another place which might be more favorable. This same competition has undoubtedly been effective in bringing about adjustments among animals in regard to their periods of activity. We cannot say that at any given time a sudden change or reshuffling occurred. It was a long, slow process, extending through countless thousands of years. In some cases there are no important apparent structural differences between nocturnal and diurnal species. The adjustment here has been more in the habits of the animal, as in the two species of mice mentioned above. These habits may become very deeply fixed. In other cases, however, there are modifications which make the animal better fitted for life at night. The maintenance of these characters and their evolution were probably influenced by competition with other animals for *Lebensraum.* Such changes as are found in the eyes of some animals enabling them to see rather well in dim light are of negative value under conditions of bright illumination. In fact, they are often quite blind in bright light. Other forms with highly developed tactile and olfactory senses and parallel degeneration of the eyes are in a similar situation. The extreme example of this is the complete loss of eyes in many cave animals.

The forces which led to the development of nocturnal and diurnal animals were doubtless varied. In some cases competition coupled with small evolutionary changes in a given direction was an important factor. In others, the environmental conditions during the day were such that certain animals were unable to survive and only those which remained hidden during the day, going abroad at night, were able to continue their existence. Desert animals are a good case in point. During the day the heat is so intense and shelter so sparse, that most of the animals remain quiescent. They come out at night when it is cool and small amounts of moisture, providing the water so necessary for life, condense on the ground surface.

Now that scientists have become aware of this division of animals into groups which are active at night, active during the day, or active regardless of the environmental conditions, there are two methods used in further analysis of the problem. The most obvious one is to go into the field and make first hand observations.

Professor Orlando Park of Northwestern University was one of the first ecologists to make extensive studies of the nocturnal environment. For many years it had been regular procedure for students in animal ecology to study animals in their normal environment, but Dr. Park was the first to make all-night field trips an integral part of the field program.

Photo by Fred Baarsch

Typical observation station on an all-night field trip.

The procedure followed on the all-night field trips is that used in all accurate field studies of the nocturnal environment. Instrumental analyses of the various environmental factors are made at regular intervals throughout the period, starting before dusk and continuing throughout the night till after dawn the next day. In the late afternoon a trail is laid out in the forest and regular trips are made over the same route at intervals during the night. Regular stations are marked out on stumps, fallen logs, live trees, and other habitats. Observations of the animals seen at each station are made and recorded, but no animals are collected. In this way the ordinary life of the community is not upset during the trip and the results give a more or less accurate story of the normal changes in the fauna as the night progresses. Accurate field notes are kept on all the animals observed:

mammals, snails, insects, spiders, and others. With the aid of a good flashlight, preferably one which may be attached to the hat so that the hands are free, it is surprising how many animals can be recorded. The gradual appearance of certain ones as the night progresses and their disappearance with the coming of morning is striking. A brief summary of the results obtained by a Northwestern University ecology class is shown in the table.

Percentage of Total Number of Animals Seen During Each Time Range

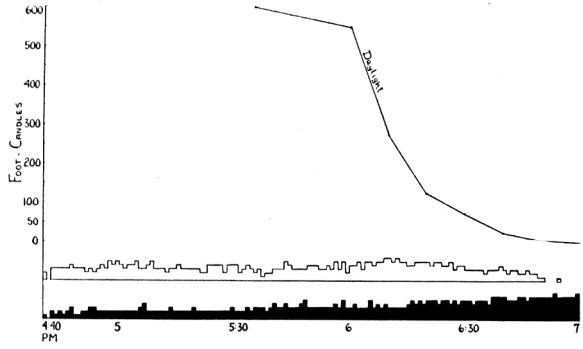
TIME	NUMBER SEEN	PER CENT OF TOTAL
9-10 P.M.	138	19.5
10-11 P.M.	191	27.0
12-1 A.M.	168	23.7
2-3 A.M.	92	13.0
3-4 A.M.	57	8.0
4-5 A.M.	32	4.5
5-6 A.M.	29	4.1
TOTALS	707	99.8

The table indicates the number of animals seen during each time range and its percentage of the total number seen during the night. Although a good many animals had become active by nine o'clock the peak for number of animals observed during any one hour was the period between 10 and 11. From 11 o'clock on there was a gradual falling off in numbers until dawn when only a very small number were seen. This period, when the night laborers have retired and the day workers have not yet risen, is characteristically barren as far as animal life is concerned.

Collecting animals at night is becoming a profitable enterprise for taxonomists. Many animals which have been recorded as rare are now proving to be nocturnal. In the past, many collectors worked hard all day and then spent the evening around a comfortable campfire. A more even distribution of time between the day and night gives a better sample of the animals present. Several species of Arizona snakes, including *Phyllorhynchus browni*, a leaf-nosed snake, and *Chilomeniscus cinctus*, the banded burrowing snake, have been rare in collections. Herpetologists working in the West have found that these "rare" snakes may be collected in considerable numbers by the simple expedient of driving slowly along the road at night and picking the snakes out with the headlights of the car (Gloyd, 1940).

Some of the members of a community produce characteristic sounds from time to time during their active periods. When one is able to connect the sound with the animal it is not actually necessary to see it in order to be sure of its presence. Birds, some insects, and amphibians are familiar examples. Several years ago the writer spent a summer at the laboratories of the Institute for Research in Tropical

America, located on Barro Colorado Island, Gatun Lake, Panama Canal Zone. This island has been set aside by the government as a natural preserve to be used by scientists in their studies of the trop- ical rain forest, better known as the jungle. In collaboration with Professor Orlando Park and Albert A. Barden of Northwestern Uni- versity, a study was made of the changes in vocalization of animals during the day and night (Park, Barden, and Williams, 1940) . Reg- ular readings (perhaps hearings would be a better word) were made from a half hour before sunrise to an hour after and similarly for an hour before sunset to a half hour after. These data gave a picture of the critical period, that time when one group is retiring and another is awakening. Additional readings were made at intervals throughout the day and night. Two of us sat down and counted the number of calls per minute for those animals which we definitely knew; one counting and the other keeping time and recording the data. Sub-

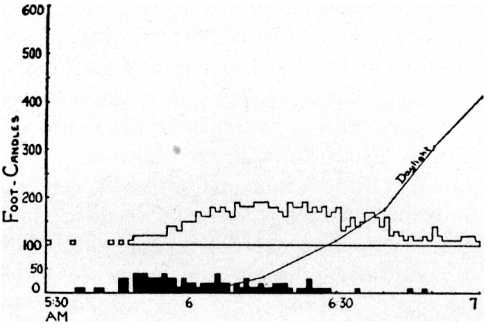


Average vocalization for dusk period for all species studied at Barro Colorado Island. Light intensity is average for dawns studied. White block indicates sound emission of diurnal animals; black block that for nocturnal animals. One small square represents sound emission for one species or group of closely related species for one minute. (After Park, Barden, and Williams, 1940)

sequently this information was lumped together for each species, giving a record of the change from night to day, and vice versa. At dawn and dusk there seems to be a peak of vocalization for many of the forms studied. The typical changes occurring at dawn and dusk are shown in the accompanying graphs. The night animals commence to vocalize sporadically with the coming of dusk and as night advances they are more and more in evidence while the diurnal ones gradually cease. At dawn the process is just the opposite.

The observational methods outlined above are valuable because they give a broad view of the nocturnal fauna but an exact analysis of the

reasons for this condition, and also the determination of how firmly the nocturnal habit is fixed in a given species, requires the experimental approach. Professor Park and his students have been pioneers in



Average vocalization for dawn period for all species studied at Barro Colorado Island. See preceding figure for explanation. (After Park, Barden, and Williams, 1940)

much of this work. In all cases experiments are carried out in a cabinet where the environmental conditions can be rigidly controlled. The temperature and humidity can be held constant and light is controlled so that constant light, constant dark, or any degree between these two extremes can be maintained. The periods of activity are recorded in various ways, the simplest method being to place the animal in a cage suspended at the four corners on wire springs. Any slight movement of the animal causes the cage to move and a pointer fastened at one end of the cage records this movement on a wax paper ribbon affixed to a clockwork mechanism which revolves once in twenty-four hours. In this way a record is kept of all movements made by the animal. It is a very satisfactory method for animals such as lizards, toads, and mammals but for small insects it is not sensitive enough. A number of methods have been developed for such insects, but the best seems to be the audio-frequency apparatus used by Park (1937) . This device contains a very sensitive microphone which picks up sounds as faint as the beating of a fly's wings and, after magnification by a series of vacuum tubes, translates them into electrical energy operating a pointer which marks a twenty-four hour record similar to that described above.

These two types of apparatus are only a few samples of a great many that are in use in different laboratories. Each kind of animal presents a different problem and suitable means for accurately recording its movement must be developed. To describe all of the modifications

used would be too lengthy a procedure but, in general, rather accurate means have been devised and many animals have been carefully studied under controlled conditions, so that we now have obj ective proof of their nocturnality or diurnality.

The results of these experiments indicate that there are three general types of animals in respect to their periods of activity. The alternation of periods of activity with periods of rest is called an activity rhythm. There are nocturnal animals, diurnal animals, and animals which are active either day or night—called arhythmic animals. The apparent cause of definite rhythms has been ascertained in a number of cases. In some animals the rhythm of activity and rest is controlled by the environment. The forest cockroach *(Parcoblatta pennsylvanica),* when held under conditions of constant dark, is active until fatigued. This insect is nocturnal because it reacts negatively to light. As soon as light is removed it starts moving about and will continue to move until fatigued, regardless of the time of day or night. When light is introduced, the cockroach will immediately seek cover.

A common milliped *(Spirobolus marginatus) is* nocturnal, but its activity is apparently not affected by any of the external factors. When placed in a cabinet under controlled conditions of constant darkness its activity was largely confined to the hours of darkness. In one experiment (Park, 1935) a milliped was kept for a total of 432 hours in constant dark yet 88 per cent of its activity was at night. This rhythm must therefore be very deeply fixed in the habits of the animal.

Schiller once said, "The light is shunned by sinners and evil spirits only." On the basis of the facts presented here we must admit that the case against these living forms which prowl at night is not really as black as Schiller supposed.

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Huachuca Juan

AUDREY STEPHENS LOWRIE

Juan was meant to live among the pines of the Huachuca Mountains in Arizona; instead he lives among Chicago's skyscrapers and is a well acclimated pet. By some mishap, Juan became separated from his family when only a few weeks old, but before disaster could overtake this little orphaned squirrel he was rescued by a member of the Offield-Beaty Arizona Expedition.

Juan is an Arizona grey squirrel and is a member of the same subgenus as the fox squirrel. In appearance he resembles the local grey squirrel except that he is slightly larger and the general color of the upper parts is grey mixed with black and white. His tail has a yellowish brown dorsal stripe which is fringed with white. He chatters a good deal, often to himself, and scolds vehemently anyone who attempts to approach him while he is engaged in the cracking of a nut. When he is particularly perturbed about something he may " give a little whistle" which is really very comical to hear.

It was such a delight to watch this clumsy little animal, with his big feet, grow to sturdy manhood. When he was three months old, he weighed half a pound; two weeks later he weighed two-thirds of

a pound, and now at ten months, Juan tips the scales at one and one-half pounds. For a while he had a pet flea which proved to be no little problem—every time the flea bit, Juan scratched; and every time Juan scratched, he went tumbling over.

During the first two weeks Juan heartily accepted milk from an eyedropper. As he grew a little older, his diet began to change to one more substantial, and today he eats nuts and many other fruits, vegetables, and such savory "specials" as cornflakes and cookies. This transition was a most interesting one to the watcher.

His first nut, although only a peanut, really took him to task. After a few minutes of ineffective gnawing, which accomplished little, he allowed his benefactor to shell it for him. However, even with this help, it was difficult for him to chip off pieces of nut, swallow them and, at the same time, maintain his balance. At last he decided to disregard the problem of equilibrium and simply allowed gravity to hold sway. As a result, he consumed his first nuts while reclining in a very lazy fashion. After a meal, most of the nut meat was to be found strewn about the floor in tiny pieces.

But practice makes perfect, and within a month he was able to penetrate, with his menacing incisors, the shells of the hardest nuts. When he feels that he has eaten enough, he scampers about the apartment seeking suitable hiding places for what is left. Often he may be seen patting a nut down in some safe location in the same manner in which untamed squirrels do.

The day he discovered water running from a faucet in the apartment where he is king, he decided that here was an ideal spa, and one may expect to find him luxuriating in this man-made shower at a regular hour each day.

This furry pet has a wire cage which is well supplied with soft cloths into which he snuggles—covering himself completely—when he sleeps. Usually he curls himself up like a little ball, or he may sleep on his back; occasionally he sprawls flat on his little white tummy, and thus he slumbers until daybreak, when his chattering and scolding announce his awakening.

Shiny objects attract his attention. One day three bright, silver quarters disappeared. They were later found in one of his innumerable caches. And so it is with other gadgets. He seems to think everything is manufactured especially for him to play with—or do away with, if possible. What he can do to a pencil would amaze you.

Molting was a strange spectacle to one who viewed it for the first time. The hair first fell out in the region of the hind and forequarters. The process of replacing lost hair was very slow; it lasted from early October into November. During this time Juan was a sorry sight, for

patches of fur were missing here and there ; the old fur compared with the new was quite dirty and shaggy. At last molting was completed and Juan emerged—a handsome fellow in a new winter coat.

When left to his own devices for a few hours in the car one day, he discovered that he could get out through the opening to the battery. The report has it that after investigating the neighborhood, Juan slipped through an open door into a nearby house. A very frightened lady summoned the police who captured him, with what to them was surprising ease, and set him free in a nearby park. Now you may be sure when, two hours later, his master and mistress discovered their loss, they were greatly distressed. But the police were located and kind enough to point out the exact spot where their former captive had been released. Juan was having the time of his life on the uppermost branch of a tall tree. Nevertheless, he responded immediately when called, and "mom and pop" are very happy to have their "family" together once more.

Test Your Nature Lore

Are these statements true or false?

1. The female swan is called a "hen."
2. Hummingbirds are our fastest fliers.
3. Potential insect damage in the United States is annually reduced about one-fourth by birds.
4. Penguins are found only in the region of the South Pole.
5. Birds which are active and able to feed themselves shortly after hatching are called "altricial" in habit.
6. A ruffed grouse drums by beating the air with its wings.
7. Lead poisoning is an important factor in the death of large numbers of wild ducks.
8. The wood duck is the only tree-nesting duck in the United States.
9. Young ruffed grouse live chiefly on insects for the first few weeks of their lives.
10. When a bird shivers, its temperature rises.

Answers on page 17

Notable Discoveries of Birds' Eggs

EDWARD R. FORD*

Since naturalists are concerned with the life histories of the forms of life which are their co-dwellers on this planet, they are, as might be supposed, especially curious about the beginnings of such histories. Hence the mating and reproductive habits of animals are particular objects of their research.

Mammals, being chiefly sedentary, are more easily studied than birds. We may know whether a mammal of a given species brings forth its young in a burrow, cave, hollow tree, or in a nest of "trash." But of many species of birds the habits and habitats in the nesting season have been unknown for long and, in some cases, have not been discovered yet.

Even a species so recently extinct as the passenger pigeon presents the question as to whether, normally, it laid one or two eggs. Bent, in his " Life Histories," says, "probably more often only one." Authentic eggs of the Carolina paroquet, a species of which possibly a few still exist, are in collections, but whether they were taken in holes in trees, as seems more likely, or in open nests is not certainly known.

Perhaps one of the most curious facts, of the kind treated here, relates to the nesting of the solitary sandpiper. It was not until 1903 that its nest was discovered in a tamarack swamp in Alberta. There it was found to lay its eggs in the old nests of such altricial species as robins and waxwings instead of on the ground as is usual with shorebirds. That the discovery had not been anticipated is but another proof that we often fail to make use of the knowledge we have. It had been known for sixty years that the green sandpiper of Europe, a related species, thus deposited its eggs. Meantime, honest but confused observers had reported the finding of its eggs on the ground in localities far from its known breeding range, as since determined.

In 1909 Admiral Peary discovered the first known eggs of the knot, another of the shorebirds. Col. H. W. Feilden, writing in *British Birds,* says,. "It is highly commendable that Peary, on his return from the North Pole to Cape Sheridan and in the midst of his engrossing and more important duties, found occasion to take the unique photographs here produced." The only eggs known of the wandering tattler, still another bird of this group, were taken in 1922, on a gravel bar of a stream in Arctic Alaska.

The eggs of Harris's sparrow, a finch common in migration in the Central West, were unknown until 1931. With the completion of the Hudson Bay Railway to Ft. Churchill the "wilderness summer home of this bird," as described by Semple and Sutton, was found.

**Honorary Curator of Oölogy, Chicago Academy of Sciences.*

The Academy's collection contains an egg of Kittlitz's murrelet; as far as known the only other specimen is in the Smithsonian Institution. Auks, murres and puffins, to whose family this species belongs, lay their eggs on the cliffs or among the boulders of the seacoast. But our bird goes some miles inland and in the hills or mountains deposits its single egg on the bare ground. One of the Academy's native collectors in Alaska, having been coached by letter, succeeded in finding and securing the bird and its egg (and then unluckily breaking the egg) and, the next year, in duplicating his find (and then unluckily missing his shot at the bird).

Among the fine pictures in the Academy's film collection are those of the blue goose, taken in Louisiana where, apparently, nearly all the birds of the species on the North American continent gather in winter. As late as 1929 the only eggs known were of wing-tipped birds which laid them while in captivity. But, in the year named, Soper, a Canadian naturalist, found the breeding area in Baffin Land.

Incidentally, the Academy's collection contains the eggs of several species which are near to elimination from the list of birds of the United States. Recently it was estimated that there remain not more than thirty pairs of the everglade kite in Florida—the only habitat of this form within our borders. The two eggs in the Academy's collection were taken 35 years ago. It should be said that not museum collecting but drainage, and the consequent disappearance of the snails on which this species feeds, is responsible for its present status.

Similarly the aplomado falcon, none of which, it is said, has been reported for a decade from the lower Rio Grande valley, is considered to have been the victim of a "kill-the-vermin" cult which is likely to obtain in agricultural regions. This bird was killed in numbers by the device of setting a prairie fire and shooting the falcons which hawked about its periphery, oblivious to anything save the capture of fleeing rodents. The eggs in the Academy's collection were taken in the Brownsville region in 1904.

Apart from specimens which, in a future period, may support some distributional claim, such as, "formerly nested" or "formerly occurred in numbers in the nesting season," our collection contains eggs of Asiatic birds found but casually in Arctic Alaska. The rufous-necked sandpiper is one of these and the eggs, taken with the nesting parent, comprise the only set known to have been secured in North America. These museum items came from an intelligent native collector, able not only to write English but to use a typewriter.

The writer had just come to an end of this piece when he read, in the *Chicago Tribune*, an Associated Press dispatch from Winnipeg reporting the "solution of an eighty-year-old mystery"—the where-

abouts of the breeding ground of Ross's goose. The bird was found about 1860 and named for an early factor of the Hudson Bay Company. Its nesting place, on islands in a lake twenty-five miles southeast of Chester Bay, Queen Maude Gulf, was discovered by two post managers of the same company.

Thus the world, at a time when—according to some of us—its "goose is cooked," is asked to take note of a goose egg.

Test Your Nature Lore

Answers to questions on page 14

1. False. The female swan is called a "pen," the male, a
2. False. The duck hawk has been clocked at 165 to 180 miles per hour, the hummingbird at around 80.
3. True. This is the estimate made by the U. S. Department of Agriculture.
4. False. They occur at various places in the southern oceans, as far north as the equator.
5. False. Such birds are called "precocial." Other birds, such as the robin, in which the young are helpless at birth and for some time thereafter, are called " altricial."
6. True. The stories of the ruffed grouse "drumming" by beating against a hollow log with its wings have been disproved by motion pictures. The noise is made by the movement of the wings against the air.
7. True. The duck swallows the lead shot while feeding in the bottom ooze. The shot dissolves in the gizzard and, if six or more pellets have been swallowed, the lead released into the blood stream kills the bird.
8. False. The bufflehead and goldeneye ducks commonly nest in trees.
9. True. The young ruffed grouse obtain the insects almost entirely from the leaves of the plant canopy above them.
10. True. Experimental evidence shows that shivering, since it contracts the muscles, brings about a rise in the body temperature correlated with the expenditure of energy.

Plant or Animal?

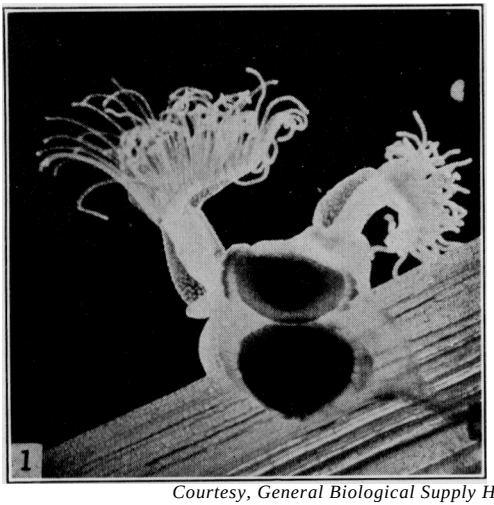
DONALD C. LOWRIE*

One of the many duties of a museum biologist is to identify any object of natural history about which anyone happens to be curious. Usually this is a routine matter for the things most commonly brought in for determination are the most easily identified. Occasionally, however, uncommon animals turn up and one's interest is thereby stimulated. Last fall a representative of the Academy was asked to go and see a strange floating mass in the south lagoon of Lincoln Park. On examination, this shapeless thing proved to be a colony of minute organisms belonging to the animal phylum Bryozoa, sometimes called Polyzoa. Zoologists know these animals as *Pectinatella magni fica,* and the common name is moss-animalcule.

In the fall of the year colonies of the moss-animalcule are sometimes found floating on the surface or attached to the bottom of fresh water ponds, lakes, and streams. A colony has the appearance of a large mass of gelatin covered with a gray-green sheet of moss. In most cases there is no sign of life to indicate that this is more than a mass of waste material. Early in the spring the colonies are small balls of gelatin, but by fall they may reach the size of a foot or more in diameter. The only semblance of pattern is the rosette arrangement of individuals on the surface of the gelatin which may be seen in the photograph.

**Assistant Curator, Chicago Academy of Sciences.*

Closer examination with a microscope reveals a multiplicity of life quite unexpected in such a dirty mass. Greeting one's eye are hundreds of hydra-headed monsters (Fig. 1) waving their tentacles slightly, while catching the minute one-celled protozoa and other microscopic animals on which they feed. Each individual is equipped with a double row of sixty-five to eighty tentacles, arranged in the shape of a horseshoe. This structure is called a lophophore and is characteristic of the Bryozoa as well as several close relatives. The tentacles are covered with small hair-like projections called cilia. The cilia are in constant motion and the collective efforts of innumerable units cause a steady stream of water to sweep toward the ever greedy trap-door of the mouth. The small organisms which serve as food are carried along by the current so that even though the colonies do not possess the power of locomotion, sufficient food is available. This is a case of the mountain coming to Mohammed. The mouth is truly a trap-door, having a cover which fits closely in much the same way as does the cover of a trap-door spider's burrow. The rest of the digestive system is a simple curved tube, divided into a stomach and intestine, which opens to the outside near the lophophore.



Courtesy, General Biological Supply House, Inc., Chicago

A moss-animalcule, highly magnified.

All individuals of the colony are closely joined together. They are protected only by means of a cellophane-like covering, the ectosarc, into which the lophophore and other delicate parts are drawn when the animal is disturbed. The Bryozoa are much more numerous as fossils and more widely represented in the sea than in fresh water. Some of the marine dwellers have specialized structures for cleaning

the colony: a protection against particles of debris, immature barnacles, coral, and other sedentary animals which may alight on them. Other than that afforded by the structures mentioned, the Bryozoa are without means of protection, but they are probably not very tasty to other animals and need little.

At least two features of the life of these animals are unique : the method of "over-wintering" and the development of the "brown body," an adaptation for excretion. During the summer the growth of a colony is accomplished in a rather simple manner by the pinching off of new individuals from the already existing polyps. Sexual reproduction, in which the eggs develop inside the body in some species and outside in others, takes place in much the same way as in other animals. The larval form which develops shows affinities to the larvae of molluscs and worms.

The freezing-over of ponds and lakes during the winter makes ordinary growth and reproduction impossible. The Bryozoa have met this problem with a sort of encystment stage, the statoblast. This is a round, flat body which provides for a peculiar type of reproduction, similar to the production of gemmules by sponges. If the statoblasts were to fall to the bottom when formed, and a period of warm weather were to stimulate development, subsequent freezing would result in death. However, an internal air sac permits the statoblasts to float on the surface and become frozen in the ice where they remain throughout the winter. With the spring thaw, they are released and fall to the bottom where they may begin the development of a new colony. Freezing does not hurt them at all ; in fact, like many seeds they must go through this period of freezing before they can develop. Statoblasts kept from freezing will not reproduce a new colony, while those which have been allowed to freeze for a time will develop under favorable conditions.

The formation of a "brown body" seems to be the method by which nitrogenous wastes are eliminated from the body, for there is no other apparent means of excretion. At frequent intervals the body of the animal begins to lose its normal shape and takes a spherical form, like a brown ball, within the ectosarc. In a few days, a new animal is formed around the brown body which comes to lie in the intestine of the new polyp. Eventually the brown body is eliminated with other waste materials and life goes on as before. This is indeed an interesting method of excretion, if such is its true function.

The nervous system consists of a small ganglion or "brain" between the mouth and anus, with a network of nerves passing to all parts of the body. Respiration is carried on directly through the lophophore and other exposed parts, and the functions of a circulatory system are performed by the body fluids, without any definite vessels.

MUSEUM ACTIVITIES

The Winter Lecture Series

The last of the annual winter series of Sunday afternoon lectures was given on March 8. The above photograph, taken on March 2 when the attendance was so large that the lecture had to be repeated to accommodate the audience of nearly six hundred, shows the crowded conditions which prevail on such occasions in the present auditorium. The entire series was well attended and it was sometimes necessary to close the doors before three o'clock because even standing room was filled. It is sincerely hoped that more adequate facilities for the presentation of these lectures will be available in the near future.

Meet the Officers of the Academy

NATHAN SMITH DAVIS, III, PRESIDENT

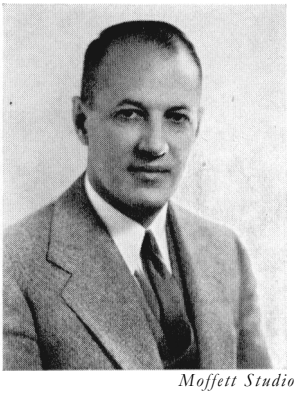
Dr. Davis has been a member of the Academy for many years. He served as Secretary from 1926 to 1939 when he was elected President. He was graduated from Harvard University in 1910 and from Rush Medical College in 1913. Active in many professional organizations, he is a Fel- low of the American College of Physicians and of the Institute of Medicine of Chicago, past- president of the Chicago Medical Society, and treasurer and trustee of the National Physicians Committee for the Extension of Medical Service. In addition to his private practice, he holds the position of

He has published numerous technical papers on diseases of the heart and other aspects of medical science in which he is especially interested. Dr. Davis' long association with the Academy is almost a family tradition. His grandfather, one of the founders, and his father both held important offices in the organization.

TAPPAN GREGORY, VICE-PRESIDENT

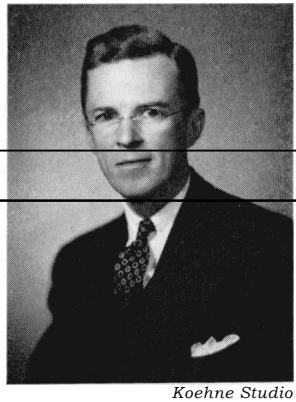
Mr. Gregory is widely known in his profession and in his avocation—the photography of wild animals. A graduate of Yale University and of the Law

School of Northwestern University, he is now a member of the firm of Bayley, Webster, Gregory and Hunter; chairman of the Committee on Character and Fitness for the First Appellate Court District ; chairman of the Committee on Credentials and Admissions of the American Bar Association; and past-president of the Chi- cago Bar Association. In the field of natural history and conservation he is national president of the Isaac Walton League and vice-president of the American Forestry Association. He has published three books on mammals and animal photography and numerous articles in scientific journals and magazines devoted to natural his- tory. He is a member of the Board of Scientific Governors of the Academy and Honorary Curator of Mammals



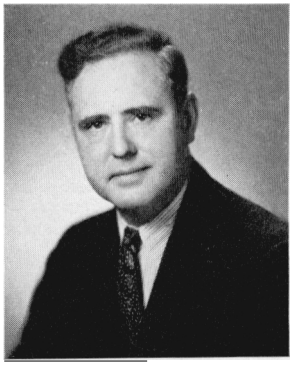
Moffett Studio

FAIRBANK CARPENTER, VICE-PRESIDENT



Koehne Studio

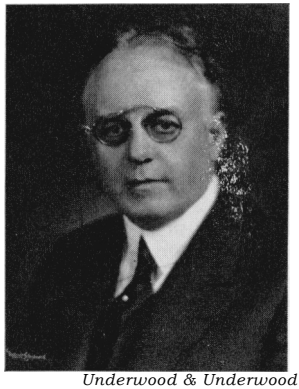
After studying at Harvard University, Mr. Carpenter was for ten years a member of the firm of George B. Carpenter and Company. In 1935 he became an insurance broker associated with the State Mutual Life Assurance Company. His interest in photography of wild life led to his association with the Academy which he served as Trustee from 1926 to 1931. He was elected Vice-President in 1938.



VERNE O. GRAHAM, SECRETARY

Dr. Graham studied at Ohio Northern University and the University of Chicago, receiving the M. S. and Ph. D. degrees from the latter institution. His successful career as a teacher began in Great Falls, Montana, in 1917. A year later he came to Chicago and he has been associated with the Chicago Public Schools ever since, first as a teacher and later as a principal. He served as a member of the Board of Scientific Governors of the Academy from 1934 to 1939 when he was elected Secretary. At a recent meeting of the Board of Trustees and Scientific Governors, he was made Honorary Curator of Botany. He is president of the Illinois State Academy of Sciences and past-president of the Conservation Council. Botany is the field in which Dr. Graham is most interested and his studies have been mainly with the mushrooms and their allies. His publications include scientific papers on the fungi and also a number of articles in the field of education.

HENRY S. HENSCHEN, TREASURER



Underwood & Underwood

Mr. Henschen attended the Chicago College of Law and received the L. L. B. degree from Lake Forest University in 1896. He was cashier and vice-president of the State Bank of Chicago from 1908 to 1920, president of the Congress Trust and Savings Bank from 1926 to 1930, and president of the Chicago Bank of Commerce from 1930 until his retirement in 1932. His association with the Academy began in 1910 when he became a Trustee. He served as Treasurer of the Academy from 1910 to 1921 and was again elected to this office in 1940.

Young Naturalist Honored by Academy

At a recent meeting of the Board of Trustees and Scientific Governors, Gerard Darrow, youthful expert on ornithology and other aspects of natural history who has astounded the listeners to the Quiz Kids radio program by his breadth of knowledge, was elected to Life Membership in the Academy. Gerard is eight years old and it is believed that this is the first time anyone so young has been honored in this way. Formal presentation of a certificate of membership will be made at the Quiz Kids program, NBC network, on April 9.

Changes in Personnel of the Museum Staff

After a period of many years with the Academy, Miss Grace Z. Harsch retired from active service March first. Miss Harsch has served the Academy loyally in various capacities, including that of assistant in preparations, membership secretary, and librarian in charge of the . reading room. She is held in high regard and her many friends wish her much happiness.

Walter L. Necker, assistant curator in charge of the reptile collection and the scientific library, has resigned in order to. initiate a commercial project dealing with scientific books and papers. Mr. Necker has a fine stock of books and pamphlets to form the nucleus of his new business and his expert knowledge of the literature in natural history will contribute to the success of this new venture. Should members of the Academy need scientific publications, or assistance in obtaining rare or out-of-print items, "Natural History Books," 612 Dickens Ave., will be a good place to look first.

Miss Janet Sibley, secretary to the director, resigned last December to become the bride of Dr. Theron Grant Randolph. Her home is now in Milwaukee, Wisconsin, where Dr. Randolph is practicing medicine.

Miss Sibley has been succeeded by Miss Virginia G. Haskins, a graduate of the Northwestern University School of Education.

Alfred M. Bailey Lectures at the Academy

Under the auspices of the Illinois Audubon Society, Alfred M. Bailey, Director of the Colorado Museum of Natural History and former director of the Academy, gave a lecture entitled "Desert Islands of Mexico," in the Academy Auditorium on the evening of March 17. Motion pictures in color made among the arid islands off the west coast of Mexico last spring included interesting sequences of tropic birds, boobies, man-o'-war-birds, sea lions, and the sea elephants of San Benitos.

Bird Banding Conference

The first Chicagoland Bird Banding Conference, sponsored by the William I. Lyon Bird Banding Council and the Academy, was held Saturday, March 15. Morning and afternoon sessions were devoted to papers on bird banding and related subjects. After a dinner at the Parkway Hotel, the group returned to the Academy Auditorium where Bob Becker of the *Chicago Tribune* gave a talk entitled "Birds We'd Like to Meet," illustrated with motion pictures in color.

The Bird Banding Council, named in honor of the late W. I. Lyon, dean of midwestern bird banders, is a group of bird students in the Chicago Region organized recently for the promotion of the banding method. Earl G. Wright of the Academy staff is President.

Annual Meeting

The Eighty-fourth Annual Meeting of the Academy will be held in the Academy Auditorium Monday evening, April 14. Announcement of the program will be in the mail shortly.

Bird Walks in Lincoln Park

Miss Doris A. Plapp, Secretary of the Illinois Audubon Society, will conduct another series of bird walks in Lincoln Park on Saturday mornings, April 5 to May 24 inclusive, except May 10. The groups will leave the Academy building at 7:45 A.M. Anyone interested in birds is welcome.

Museum-Schools Relations Conference

A conference on cooperative relationships between museums and schools is to be held on Saturday, April 19, at the Museum of Science and Industry. School and museum people of Chicago and vicinity will meet to hear what has been accomplished in the past year by the Chicago Museum-Schools Relations Committee and to make plans for the development of the great possibilities which lie in a more effective use of museums by the schools.

The Chicago committee was formed last spring as a part of the National Committee on Museum-Schools Relations of the Progressive Education Association. During the past year it has met each month at the Academy and the major accomplishment is a "Guide for the Educational Use of Chicago Museums" which will be available for teachers in the next few weeks. The guide tells what each museum has to offer in each of eleven fields of study. Miscellaneous information about the local museums and their various services is also included. A more complete handbook which will adequately meet the needs of the classroom teacher is being planned.

Another problem which has been considered is the effectiveness of museum visits. A trial questionnaire was prepared and distributed by each museum to school groups after their visit to the museum. The results are being tabulated and, although some general trends will be evident, it will be necessary to make a more extensive survey before definitive results can be shown.

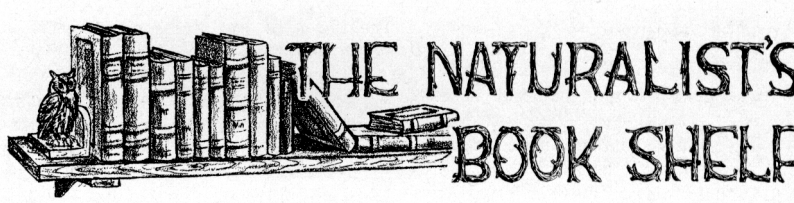
The officers of the Chicago committee are Mrs. Leota Gregory Thomas, Field Museum, Chairman; Ramsey Wieland, Art Institute, Secretary; Mrs. Bertha F. Royals, Chicago Public Schools, Chairman of Handbook Committee; Dr. Walter A. Anderson, Northwestern University, Chairman of Evaluation Committee; Miss Frances Presler, Winnetka Public Schools, and Dr. Eliot C. Williams, Jr., Chicago Academy of Sciences, Co-chairmen of Conference Committee.

New Honorary Curators

At a meeting of the Board of Trustees and Scientific Governors on January 16, Anna Pedersen Kummer was elected Honorary Curator of Botany, and Dr. Verne O. Graham, Honorary Curator of Mycology.

Visitors from Australia

On a tour of American museums sponsored by the Carnegie Corporation of New York, representatives of three museums of the Australian region and of the California Academy of Science visited the Academy on January 20. The group included Joseph Kingsley of the Australian Museum, Sidney; Patrick J. O'Brien of the Canterbury Museum, Christchurch, New Zealand; R. Boswell of the Queen Victoria Museum, Launceston, Tasmania; and Frank Toess of the California Academy, San Francisco.



NATURE RECREATION

By William Gould Vinal

McGraw-Hill Book Company, Inc., New York, 318 pages, illust. $3.00.

William Gould Vinal has long been a leader in the field of nature recreation. He is Professor of Nature Education and Director of the Nature Guide School, Massachusetts State College. His well written book fills a much needed place in the library of all nature lovers. It is especially valuable for leaders of nature-study groups and teachers of science. The first section deals with the philosophy of nature recreation and points out many important and oftimes overlooked phases of the study of nature. The second part of the book is concerned with practical applications and gives many valuable suggestions to those who supervise the work of others in nature study. Parents who wish to instill a love for nature in their children will find in this book a most useful ally.

—Eliot C. Williams, Jr.

THE NATURALISTS' DIRECTORY

The Cassino Press, Salem, Mass., 1940, 232 pages, $3.00.

The thirty-second edition of The Naturalists' Directory contains the names, addresses, and special subjects of study of professional and amateur naturalists of North and South America and other parts of the world. A list of periodicals dealing with subjects of natural history and a directory of natural history museums form a book which is a valuable aid to all persons actively interested in natural history.

THE COVARRUBIAS REPRODUCTIONS

Schwabacher-Frey Co., San Francisco, Calif.
I. Peoples of the Pacific, 38x25 in. $2.00
II. Flora and Fauna of the Pacific, 38x25 in. $2.00
III. Art Forms of the Pacific, 38x25 in. $2.00
IV. Economy of the Pacific, 38x25 in. $2.00
V. Native Dwellings of the Pacific, 25x19 in. $1.50
VI. Native Means of Transportation, Pacific Area, 25x19 in. $1.50

These color reproductions of the famous murals in Pacific House, San Francisco, by Miguel Covarrubias are an exceedingly effective means for the presentation of geography. In each case suitable representations of the particular subject are superimposed on a map of the Pacific Area, for example, in Plate II representative animals and plants are indicated in each of the lands which surround the Pacific Ocean. These maps are suitable for framing and would add to any room, particularly a library or a child's room.

MAN AND THE LIVING WORLD

By E. E. Stanford

The MacMillan Company, New York, 1940, xxviii, 916 pages, 450 illust. $3.50.

In the last few years many of our colleges and universities have added survey courses to their curricula. This volume is a text for a survey course in the biological sciences. As such, it gives the student—or the adult with a desire for knowledge in the biological sciences—a well written survey of the plant and animal kingdoms, human physiology, and an exposition of many of the basic principles operating in the natural world.

—Eliot C. Williams, Jr.

PRINCIPLES OF HUMAN GEOGRAPHY

By Ellsworth Huntington

John Wiley and Sons, Inc., New York, 1940; xxiv, 594 pages, 7 maps. 2 plates and numerous illustrations. Fifth ed. $3.50

In this, the latest of Mr. Huntington's revisions of an excellent text and reference work, the reader finds much that is new and, since the author has brought his discussions almost up to the present time, much that aids in the understanding of European and Asiatic problems as they exist today. The reviewer would suggest that it might well be designated as required reading for the lawmakers in Washington, D. C. It has a decidedly steadying influence.

The book is of particular interest to the biologist for the reason that there is a good deal of ecology included. To be sure, it is human ecology, but human and "animal" ecology seem identical, especially where the effects of intraspecific conflict and population pressures are concerned.

The figures and maps are particularly well chosen to illustrate the subject matter. If the author leans rather obviously toward geographical explanations of all human phenomena, we can have no real complaint. After all, he may be right !

—Donald M. Hatfield

THE MICROSCOPIC WORLD

By Frank Thone

Julian Messner, Inc., New York, 1940, 245 pages, photographs. Quarto. $3.00.

In Dr. Thone's book, the reader is introduced to the wonders of the living microscopic world in as gentle a way as possible. He does not spare scientific terms, but he explains them fully. For such a gigantic undertaking—an exposition of the studies of microscopy, bacteriology, microzoology and microbotany-the author has succeeded remarkably well. The large, easily read type and the many excellent photographs add to the acceptability of the book. In many ways this account could well be used as a treatise on general biology, as most of the major principles are covered. A history of science is given, and many examples add to what would otherwise be merely dry theory. The techniques used by Dr. Roemmert in his Microvivarium, which is well known to those who visited the Century of Progress in Chicago and the World of Tomorrow in New York, are explained as well as the new types of electronic microscopes which magnify to several thousand diameters. As an interesting popular discussion of the microscopic world, this book ranks high.

—D. C. Lowrie

INTRODUCING INSECTS, A BOOK FOR BEGINNERS.

By James G. Needham

1940,8 vo, v+ 129 pages, illust., index. $1 50.

This book on insects for beginners is presented in a straight-forward, easy style. The information contained is stated simply without any forced attempt at humor or other obvious means of catching the reader's interest. No scientific names are used and over eighty text figures amply illustrate everything discussed. The material is introduced by considering why insects should be studied ; the beneficial and noxious habits of several species give sufficient reason. From there the author passes to short descriptions of the morphology and life history of butterflies, dragonflies, grasshoppers, leaf bugs, common caterpillars, beetles, scale insects, mosquitos, and other insects. Chapters on the noxious insects which eat our foods, woolens, fruits and nuts, and the carnivores which control them, are followed by a short discussion of bees. The book ends with a discussion of means of controlling insects and tells the beginning entomologist how to make an insect collection and rear various species.

—D. C. Lowrie

(Continued on page 30)

THE NATURALISTS CALENDAR OF EVENTS

AMATEUR HERPETOLOGISTS' GROUP, H. K. Gloyd, Chicago Academy of Sciences, Diversey 5871. Meetings at Academy second Tuesday of each month, 8:00 P.M.

CHICAGO ACADEMY OF SCIENCES, Lincoln Park at Clark and Ogden Ave., Diversey 5871.

CHICAGO AQUARIUM SOCIETY, Mr. Harmon K. Greene, Secretary, Plaza 2088. Meetings third Wednesday of each month. 8:00 P.M.

CHICAGO CACTUS SOCIETY, Mr. Frank K. Balthis, President, Garfield Park Conservatory, Kedzie 1281. Meetings last Sunday each month, Garfield Park Conservatory, 3:00 P.M.

CHICAGO ENTOMOLOGICAL SOCIETY, Mr. Alex K. Wyatt, 5909 N. Virginia Ave., Ravenswood 3115.

CHICAGO ORNITHOLOGICAL SOCIETY, Mr. Rudyerd Boulton, President, Field Museum, Wabash 9410. Meetings third Tuesday each month. Eleanor Club, Stevens Bldg. 8:00 P.M.

FRIENDS OF OUR NATIVE LANDSCAPE, Miss R. B. Eskil, 6016 Ingleside Ave., Hyde Park 8313.

GEOGRAPHIC SOCIETY OF CHICAGO, 7 S. Dearborn St., Randolph 5293.

ILLINOIS AUDUBON SOCIETY, Chicago Academy of Sciences. Diversey 5871.

MOQUETTE GEOLOGISTS ASSOCIATION, Mr. George J. Huss, Secretary, Canal 1828. Meetings at Academy first Saturday of each month, 8:00 P.M.

MID-WEST HORTICULTURAL SOCIETY, Administration Building, Garfield Park, Van Buren 8100. Meetings last Friday each month. PRAIRIE CLUB, 38 S. Dearborn St., Dearborn 3737.

STATE MICROSCOPICAL SOCIETY OFF ILLINOIS, Chicago Academy of Sciences, Diverse 5871. Meetings at Academy third Friday of each month, 8:00 P. M.

WILD FLOWER PRESERVATION SOCIETY, Mrs. R. M. Strong, 5840 Stony Island Ave.

Mar. 16 Chicago Ornithological Society. Field Trip.

Mar. 16 Chicago Entomological Society. Academy library. 200 P. M.

Mar. 16 Prairie Club. South Palos Park. Chartered bus, 20 E. Randolph St. 9:00 A.M.

Mar. 17 Illinois Audubon Society, public lecture, *Desert Islands of Mexico,* Alfred M. Bailey. Academy Auditorium, 8:00 P. M.

Mar. 18 Chicago Ornithological Society. Dinner meeting, Stevens Bldg. *Herons of Bird City, Avery Island.* R. M. Strong and Christopher Holabird.

Mar. 19 Chicago Aquarium Society. Central Y. M. C. A., Chicago Room. Dinner, 6 :30 P.M., Meeting, 7:30 P.M.

Mar. 21 State Microscopical Society. Academy Auditorium, 7:30 P.M. Mr. F. T. Harmon will speak on photomicrography with slides.

Mar.22 Members and friends of the Academy to be guests at the Chicagoland Concert Hour radio program, given in the audience studio of WGN at 9: 00 P.M. After the broadcast, Dr. H. K. Gloyd, Director of the Chicago Academy of Sciences, will describe the work of the Offield-Beaty Arizona Expedition, illustrating his talk with colored motion pictures.

Mar. 22 Field Museum, public lecture. *The Leopard of the Air,* Captain C. W. R. Knight. Museum theatre, 2 :30 P.M.

Mar.22 Prairie Club. Thornton. Chartered bus, 20 E. Randolph St., 1 :35 P.M.

Mar. 23 Prairie Club. River Grove-Park Ridge. Union station, 9:05 A. M.

Mar. 25 Geographic Society of Chicago. *Burma Road*, Nicol Smith. Orchestra Hall, 8 :15 P.M.

Mar. 28 Midwest Horticultural Society. Illustrated lectures by Mr. William Beaudry and Dr. J. Steyermark at Garfield Park Administration Bldg. 8:00 P. M.

Mar. 29 Field Museum, public lecture. *Northwest Passage Patrol,* Richard Finnie. Museum theatre. 2 :30 P.M.

Mar.29 Prairie Club. Palos Circle Walk and House Party. Chartered bus, Jackson and Plymouth Ct., 1:35 P.M.

Mar. 30 Chicago Cactus Society. Garfield Park Conservatory, 3 :00 P.M.

Apr. 5 Field Museum, public lecture. *Peru Today,* William B. Holmes. Museum theatre, 2:30 P.M.

Apr. 5 Prairie Club. River Forest-River Grove. Northwestern station, 1 :24 P.M.

Apr. 6 Prairie Club. Hinsdale-Westchester, Union station, 9 :40 A.M.

Apr. 8 University Horticultural Society. Austin Town Hall, 8 :00 P.M.

Apr. 9 Quiz Kids radio program over WLS at 7:00 P.M., at which time Dr. H. K. Gloyd, Director, will present a Life Membership in the Academy to Gerard Darrow.

Apr. 10 Chicago Entomological Society. Academy library, 8 :00 P.M.

Apr. 10 Men's Garden Club of the Chicago Region. Brevoort Hotel, 6 :00 P. M.

Apr. 12 Field Museum, public lecture. *Ancient America's Most Civilized People,* J. Eric Thompson. Museum theatre, 2 :30 P. M.

Apr. 13 Chicago Ornithological Society. Field trip.

Apr. 14 Chicago Academy of Sciences, Annual meeting.

Apr. 15 Chicago Ornithological Society. *Birds of the Arid Southwest,* Earl G. Wright. Stevens Bldg. 8 :00 P.M.

Apr. 15 Biological Photographic Association Symposium on Stereophotography. 185 N. Wabash Ave., 23rd Floor. Dinner at 6 :00 П.М. ; meeting at 7 :30 P.M.

Apr. 16 Chicago Aquarium Society. Central Y. M. C. A., Chicago room. Dinner 6 :30 П.М. ; meeting 7:30 P.M. Visitors welcome.

Apr. 18 State Microscopical Society. Academy Auditorium. 7 :30 P.M.

Apr. 19 Field Museum, public lecture. *Life in a Tropical Rain-Forest,* Dr. Ralph Buchsbaum. Museum theatre, 2 :30 P.M.

Apr. 19 Conference on Museum-School Relations to be held at Museum of Science and Industry, Jackson Park, 10:00 A.M.

Apr. 20 Chicago Entomological Society. Academy library, 2:00 P.M.

Apr. 25 Midwest Horticultural Society. An illustrated lecture, *The Flowers of Hawaii,* by

Mrs. Walter Brewster, to be given at the Chicago Academy of Sciences at 8 :00 P.M. Open to the public.

Apr. 26 Field Museum, public lecture. *An Alaskan Adventure,* Bradford Washburn. Simpson theatre, 2: 30 P.M.

Apr. 27 Chicago Cactus Society. Garfield Park Conservatory. 3 : 00 P.M.

May 8 Chicago Entomological Society. Academy library, 8:00 P.M.

May 8 Men's Garden Club of the Chicago Region, Brevoort Hotel, 6:00 P.M.

May 13 University Horticultural Society. Austin Town Hall, 8 : 00 P.M.

May 18 Chicago Entomological Society. Academy library, 2 :00 P.M.

May 18 Chicago Ornithological Society. Field trip.

May 20 Chicago Ornithological Society. *Courtship in the Ring-Dove,* Dorothy Ewers. Stevens Bldg. 8:00 P.M.

May 21 Chicago Aquarium Society. Central Y. M. C. A., Chicago room. Dinner 6 :30 P.M.; meeting 7 :30 P.M. Visitors welcome.

May 25 Chicago Cactus Society. Garfield Park Conservatory, 3 :00 P.M.

May 30 Midwest Horticultural Society. Lecture by Mr. F. L. Eldridge at Garfield Park Administration Bldg., 8:00 P.M.

(Continued from page 27)

WINGS AT MY WINDOW By Ada Clapham Govan

The MacMillan Company, New York, 1940, xiv, 198 pages, $2.50.

Here is the story of a valiant woman whose release from physical and mental distress came through devotion to "her birds." In gratitude she writes a thoroughly readable account of unusual success in attracting birds.

In the preface to her book Mrs. Govan quite disarms the critic who is disposed to launch a pointed shaft. How her interest grew and how it affected the life and fortune of her family will be followed with understanding. How it led, at last, to a publicity that made possible the acquisition of an adjoining piece of woodland for a sanctuary will be heartening to those who see wild areas converted into public playgrounds and bird marshes filled in for landing fields.

Bird banding (in which her observations of the plumages of the purple finch confirmed the findings of Magee), writing of birds, and corresponding with persons attracted by her work allowed the author little time to think of her disabilities. After seven years, we are told, she was "entirely healed."

Many years ago another woman writer on birds—her name is scarce remembered—said that there is no harm in referring to "Mr. and Mrs. Robin" but to assert as a motivation of their actions a human reason or emotion was not truly to present the real nature of the bird. But publishers seem to find the anthropomorphic treatment popular and Mrs. Govan writes frankly, "I am well content that others, far better fitted for the job, should stock our libraries and shops with textbooks while I find my happiness among people who today know only sparrows and parrots and canaries in cages, for they may be tomorrow's potential bird lovers."

—Edward R. Ford

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